

## RED MICROALGAE AS FUNCTIONAL FOODS: AN INTEGRATED STUDY

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**G**lobal demand for macroalgal and microalgal foods is growing, and algae are increasingly being consumed for functional benefits beyond the traditional considerations of nutrition. Among the principal algal sources are red microalgae, which produce unique biochemicals including novel sulfated polysaccharides (SP) (including dietary fibers), unsaturated fatty acids (EPA, DHA, AA), natural pigments (phycobilproteins, zeaxanthin), and a variety of other special chemicals (e.g., floridoside) and minerals. Of particular interest are the red microalgae *Porphyridium* sp., whose cells are encapsulated within a SP and extracellular portions are dissolved in the growth medium. Those SP have unique rheological characteristics and have been shown to act as a platform for metal incorporation, taking advantage of their ion-exchange capabilities and their negative charge. The current study motivated by the ongoing search for novel, bioactive ingredients that are capable of enhancing and extending the functionality of emulsions investigated the use of SP from red microalgae as potential stabilizers in food emulsions and the combination of emulsifying and antibacterial activities of a Zn-PS complex.

**Optimization & Characterization of Oil Emulsions:** The properties of emulsions were characterized based on physical stability, electrokinetic charge and overall appearance. In addition, the study examined emulsion responsiveness to sonication and to major environmental stressors (2<pH< 8 and salinity 0-300 mM NaCl).

**Antibacterial activities of a Zn-PS complex:** Dairy emulsions and oil-in water emulsions were stable in low concentrations of a Zn-PS complex (<0.2% and <500 ppm Zn). This complex was also shown to have higher effect on inhibition of bacterial growth when compared with the algal polysaccharide alone. Overall, the data support the potential of using functional sulfated polysaccharides from red microalgae to stabilize emulsions and inhibit contamination in food applications. This information is believed to be of importance for possible utilization of red microalgal polysaccharides as novel emulsifiers in the rational design of food emulsions and potentially in other food applications. These encouraging results indicate that we should pursue the development of red microalgae as novel functional foods.

### Biography

Irit Dvir has completed her PhD at the Ben-Gurion University of the Negev, Israel in 1999. She is an expert in the study of algae and its uses in the food industry and as a dietary supplement. Currently she is a Senior Lecturer and Head of the Chemistry and Life Sciences program at Sapir Academic College, Israel. She is a member of the Council of Young Israeli Entrepreneurs and is always looking for original and innovative research projects. She has published papers in reputed international journals. Much of her work is interdisciplinary and extends beyond red microalgae to include nutrition and food manufacturing, development of novel functional foods that can positively impact health and prevent or treat metabolic diseases such as diabetes and obesity.

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